

Technology and Law Going Mental

Carolyn Kemper

2020-08-31T11:56:22

On 28 August 2020, [Neuralink gave a much anticipated update](#) on their progress to connect humans and computers. The company – founded amongst [others by Elon Musk](#) – is working on “[connect\[ing\] humans and computers](#)”. The publicity and sensationalism surrounding Neuralink fuels discussions on “[brain-reading ‘threads’](#)” that will “[stream music straight into your brain](#)” and ultimately [merge “your brain with A.I.”](#). In the near future, the activities within our brain will be recorded, analysed, and altered, shaking our conception of inaccessible mental processes. A multitude of legal issues will arise, in particular to what extent fundamental and human rights protect mental processes and neurological data collected by (therapeutic or enhancing) brain-computer interfaces (BCIs) from being accessed by states without the individual’s consent. Existing rights such as freedom of thought, freedom from self-incrimination, and the right to privacy may be interpreted to encompass scenarios of brains merged with computers. To date, however, there remains a significant gap as neurological data does not enjoy absolute protection from any interference within the existing European human and fundamental rights frameworks. This gap could be remedied by introducing [new mental rights](#).

Brain-computer interfaces: a primer

A brain-machine interface or BCI establishes a link between a brain and a device, e.g. a prosthesis, so that the machine can be controlled by the BCI user through “thought” (for a concise, instructive and amusing introduction to BCIs and Neuralink, see [Wait But Why](#); a more extensive overview by M.A. Lebedev & M.A.L. Nicolelis can be found [here](#)). It typically consists of electrodes that are placed along or underneath the scalp or inserted into the brain (alternatively, functional Magnetic Resonance Imaging (fMRI) depicts the blood flow in different areas of the brain). The electrodes of BCIs are connected to a device that decodes the recorded neural activity by using [machine learning algorithms](#) to classify neural data in real-time. Based on the analysis of neural activity patterns, the device provides feedback, e.g. by moving a prosthetic limb or by providing sensory feedback. Besides that, the inserted electrodes can stimulate specific brain regions or single neurons, much like a pacemaker.

Neuralink is not the only player in this field: [Facebook](#) and other companies as well as research institutions all over the world are working on BCIs. The intended purpose of BCIs differs fundamentally between the various actors: while some solely focus on medical and therapeutic applications (e.g. [CorTec](#)), others aim for cognitive enhancement. For example, [Facebook develops a BCI](#) to achieve “[hands-free communication without saying a word](#)”, and the ultimate goal of Neuralink is to enable humans to adapt and improve in the imminent rise of [Artificial Intelligence](#).

Achievements in neuroscience and BCI research are already impressive: cochlear and [retinal](#) implants restore hearing and vision. [The brain of patients with Parkinson's disease can be stimulated](#) to alleviate tremors and improve motor function. [Paraplegics may control prostheses \(like this woman controlling a prosthetic arm\)](#). BCIs may even help in [restoring mobility in paralysed patients](#) and facilitate [communication with people having locked-in syndrome](#). Latest research achieved the [“translation” of neural signals into speech](#) by designing a neural decoder that transforms representations encoded in neural activity to synthesise audible speech.

BCI technology may not only alleviate diseases and restore communication abilities or mobility, though. [Neuroimaging methods can already be used as lie detection tests](#), much like [evidence can be collected by analysing data captured by other implanted devices](#).

The potential abuse of BCI technology is particularly blatant with regard to totalitarian regimes. Since BCIs record the user's mental states, the most intimate information about everyday life could be collected, taking surveillance to the next level. Also [mind control](#) or changes in identity might be possible with brain stimulation. The effects of excessive electroshocks on humans have been apparent ever since the exposure of the secret CIA project [MKULTRA](#) on mind control experiments.

The vast possibilities and numerous potential applications raise the question of legal safeguards currently in place or needed to prevent dystopian outcomes.

Freedom of thought

The right of Freedom of Thought, as protected in Art. 9 of the European Convention on Human Rights (ECHR) and Art. 10 of the EU Charter of Fundamental Rights (CFR), might not be applicable to mere neural signals.

Both articles grant everyone “the right to freedom of thought, conscience and religion [...]” and protect the *forum internum*, in which people develop, refine and substitute personal thought without manifesting it in the outside world. The main goal of the protection of the *forum internum* is to [protect individuals from indoctrination or “de-programming” of beliefs](#), and from being forced to disclose their beliefs. As it relates to the *forum internum*, Art. 9 para. 1 ECHR grants [absolute protection](#) to individuals.

However, the precise meaning and scope of “thoughts” remains vague. The context indicates that the protected right relates to viewpoints, opinions, and preferences, rather than mental states and patterns of neural signals. The exposure of political views by recording neural signals and inferring the underlying belief system would therefore be governed by Art. 9 ECHR. Yet, the analysis of a BCI user's mental state and their neural reaction to, e.g. the confrontation with certain pieces of evidence, could hardly be seen as a “thought” in that sense. The subject's thoughts are not revealed, but rather certain aspects of their neurological process of thinking.

Freedom from self-incrimination

The right to a fair trial (Art. 6 ECHR and Art. 47 CFR) encompasses “the right of anyone charged with a criminal offence ... [to remain silent and not to contribute to incriminating himself](#)”. Evidence against an accused person must not be “obtained through [methods of coercion or oppression in defiance of the will of the accused](#)”. Whether brain-based lie detectors impinge on the will of the accused is not yet settled. The use of compulsory powers to obtain e.g. blood and urine samples or bodily tissue for the purpose of DNA testing does not fall into the category of self-incrimination because such [evidence exists independently of the will of the defendant](#).

Brain-based lie detection tests require more cooperation of the accused than blood sampling. With forensic neuroimaging, the defendant must perform a certain task, e.g. look at evidence or answer questions, while their neural activity is recorded and analysed. Since these reactions are automatic and involuntary, the defendant’s attempts of deception will be futile. Thus, it is questionable whether the analysis of uncontrollable neural signals impinges on the voluntariness of the statement.

In a case concerning “brain mapping”, or rather conducting a brain electrical activation profile test, the [Supreme Court of India](#) found that the involuntary administration of the impugned test falls within the scope of “testimonial compulsion”. The test does not require the subject to give any verbal responses. Instead, “inferences are drawn from the measurement of electrical activity in the brain”. The compulsory administration of such a test “impedes the subject’s right to choose between remaining silent and offering substantive information. The requirement of a ‘positive volitional act’ becomes irrelevant since the subject is compelled to convey personal knowledge irrespective of his/her own volition.”

A [U.S. court](#), in contrast, ruled data collected by the defendant’s pacemaker to be admissible as evidence. The relevant data, the recorded heart rate and cardiac rhythms at the time of the alleged crime, suggested the defendant’s guilt. The [court](#) argued that the admissibility of the data was a question of privacy rather than self-incrimination.

Privacy

Art. 8 ECHR and Art. 7 CFR protect the right to respect for private life. This provision exceeds the “inner circle” and extends to the “[private social life](#)”, i.e. the possibility to develop a social identity in private. Even [compulsory medical treatment](#) falls under the scope of Art. 8 para. 1 ECHR.

Additionally, personal data is protected by Art. 8 para. 1 CFR. Personal data is information relating to an individual who could be identified on the basis of the data and other information (cf. also [Art. 4 para. 1 of the General Data Protection Regulation, GDPR](#)). The recording and analysis of neural activity generates data concerning [health](#), biometric data as individuals can be identified based on their

[brainwave signals](#), and, lastly, other sensitive data, e.g. sexual orientation, could be drawn due to [correlations between “non-sensitive” and sensitive data](#).

The right to respect for private life can be restricted according to Art. 8 para. 2 ECHR, if such a restriction is in accordance with the law and necessary in a democratic society, especially in the interest of national security, public safety, or for the prevention of disorder or crime. Whether a restriction is justified depends on the [level of interference with private life-interests](#) (e.g. the sensitivity of the data) and the importance of its goals. Any limitation relating to neurological data must be carefully weighted with regard to the sensitive nature of biomedical data. At the same time, many applications of BCIs focus on specific neural activity, meaning that only a small fraction of the recorded or recordable information will be analysed and utilized. Also, personal data must be processed fairly for specified purposes and based on the consent of the person concerned or some other legitimate basis laid down by law according to Art. 8 para. 2 CFR.

Many [threats to privacy](#) due to BCIs resemble the problems regarding wearables, other medical implants such as pacemakers, and data analytics in general. The only, yet crucial, difference is that BCIs are melded with the body and connected to other devices (and prospectively, the internet). Hence, they are part of the so-called “[Internet of Bodies](#)”, a “[network of human bodies and data through connected sensors](#)”, akin to the Internet of Things. The biggest threat to a BCI user’s privacy is posed by “hacking”, i.e. the unauthorized access to neurological data. Nevertheless, another vulnerability is induced by state authorities’ interest in eavesdropping to safeguard national security and public safety, or prevent, detect, and prosecute crime. In this regard, state surveillance targeting BCIs may correspond to existing activities, e.g. mobile device forensics.

Emerging mental rights

In a nutshell, freedom of thought may not sufficiently protect mental processes in general, whereas the right to privacy does not generally prohibit access to and utilization of neurological data. The freedom from self-incrimination may thwart involuntary disclosure of certain neural activity but is only applicable in criminal proceedings.

Consequently, the current fundamental and human rights leave gaps that might be remedied by [introducing new mental rights](#). Besides the protection from coercive or unconsented use of BCIs (*cognitive liberty*), the control of a person over their neurological information is crucial (*mental privacy*). Furthermore, the user of a BCI should also be protected from malicious alteration of their neural processes and *mental integrity*. With potential and unforeseeable side effects of brain stimulation, the *psychological continuity* of a person, i.e. the perception of their own identity, should be protected.

Existing human and fundamental rights may be interpreted and developed to encompass these rights. Cognitive liberty and mental privacy may hinge on the respect for one’s private life and the protection of personal data. Mental integrity, for

example, is explicitly protected by Art. 3 para. 1 CFR and the right to psychological continuity can be drawn from the right to personal life. The current fundamental and human rights can easily accommodate these mental rights as guarantees under their umbrella. However, in the existing legal frameworks they are not protected as absolute rights, giving states the possibility to justify any infringement, e.g. for security reasons. The door would thus be – legally – open for state surveillance and preventive detention.

Neurological data, long considered to be unfathomable, is profoundly intimate and intensely connected to one's personality and self-identity. Therefore, the introduction of an absolute right to mental privacy is necessary to prevent "[a fundamental affront to human dignity](#)". In the absence of specific regulations, human dignity (Art. 1 CFR) could be adduced to prohibit any interference with mental privacy. Human dignity can be seen as the foundation of the right to privacy "[because personal information plays a constitutive role of who I am and can become](#)". Accordingly, any intrusion upon our mental sphere would be unlawful since human dignity is *inviolable*. Alternatively, the existing canon of rights could be extended (cf. e.g. the [Convention of Human Rights and Biomedicine](#)).

BCI technology and its new possibilities and threats will loom large in the near future, this is not a question of if but when. Existing rights must be updated to comprehensively protect mental processes and neurological data from state access and surveillance.

